CLAIMS

What is claimed is:

1. A method for reinforcing a wood support piling with a composite wrapping, said method comprising:

(A) applying a resin to a plurality of strands;

(B) joining said plurality of strands to said wood support piling;

(C) rotating said wood support piling to form said composite wrapping around said wood support piling;

(D) allowing said resin to cure wherein said composite wrapping is bonded to said wood support piling.

2. The method of claim 1 wherein (A) applying a resin to a plurality of strands comprises passing said plurality of strands through an impregnator.

3. The method of claim 2 wherein said impregnator comprises a resin bath, rollers, and doctor blades to saturate said plurality of strands with said resin.

4. The method of claim 1 further comprising passing said plurality of strands through a carriage, said carriage adapted

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to apply a tension to said plurality of strands against said wood support piling.

5. The method of claim 4 wherein said tension is within a range of 30-120ounds.

6. The method of claim 1 wherein said wood piling is at least 10 feet long.

7. The method of claim 1 wherein said composite wrapping covers a portion of said wood support piling adapted to be two feet below ground surface and four feet above ground surface when the wood support piling is installed in the ground.

8. The method of claim 1 wherein the curing of said composite wrapping causes said composite wrapping to shrink to thereby radially compress said wood support piling.

9. The method of claim 1 wherein the wood support piling has a first stiffness prior to installation of the composite wrapping and a second stiffness after installation of the composite wrapping, and wherein the second stiffness is at least 20 percent greater than said first stiffness.

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10. The method of claim 1 wherein said composite wrapping is a single, seamless layer.

11. The method of claim 1 further comprising selecting said wood support piling having a moisture content of less than 25 percent.

12. The method of claim 1 wherein said wood support piling has a moisture content within a range of 15 to 20 percent.

13. The method of claim 1 wherein said composite wrapping is bonded to said wood support piling by a mechanical bond.

14. The method of claim 1 further comprising winding said plurality of strands around said wood support piling at an angle within a range of 60-90 degrees with respect to a longitudinal axis of the wood support piling.

15. The method of claim 14 wherein said angle is approximately 80 degrees.

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16. A method for reinforcing a wood support piling with a composite wrapping, said method comprising:

(A) placing said wood support piling on a filament winding apparatus;

(B) applying a resin to a plurality of strands;

(C) applying said plurality of strands to said wood support piling to form a reinforcing layer, wherein said layer is bonded to said wood support piling.

17. A reinforced support piling comprising:

a non-hollow elongate shaft having a length and an exterior surface extending along said length; and

a composite wrapping, said composite wrapping encircling said exterior surface along at least a portion of said length, said composite wrapping forming a layer of substantially uniform thickness and materials;

wherein said composite wrapping applies a radial compressive force upon said elongate shaft.

18. The reinforced support piling of claim 17 wherein said non-hollow elongate shaft is comprised of wood.

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19. The reinforced support piling of claim 18 wherein non-hollow elongate shaft has a moisture content of less than 25 percent.

20. The reinforced support piling of claim 19 wherein non-hollow elongate shaft has a moisture content within a range of 15 to 20 percent.

21. The reinforced support piling of claim 17 wherein said non-hollow elongate shaft is comprised of a material known to crack, thereby increasing the radial compressive force.

22. The reinforced support piling of claim 17 wherein said composite wrapping is a single, seamless layer.

23. The reinforced support piling of claim 17 wherein said non-hollow elongate shaft is at least 10 feet long.

24. The reinforced support piling of claim 17 wherein said composite wrapping covers a portion of said a non-hollow elongate shaft adapted to be two feet below ground surface and

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four feet above ground surface when the reinforced support piling is installed in the ground.

25. The reinforced support piling of claim 17 wherein the non-hollow elongate shaft has a first stiffness prior to installation of the composite wrapping and a second stiffness after installation of the composite wrapping, and wherein the second stiffness is at least 20 percent greater than said first stiffness.

26. The reinforced support piling of claim 17 wherein said composite wrapping is a single, seamless layer.

27. The reinforced support piling of claim 17 wherein said composite wrapping is bonded to said non-hollow elongate shaft.

28. The reinforced support piling of claim 27 wherein said composite wrapping is bonded to said non-hollow elongate shaft by a mechanical bond.

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29. A reinforced support pole comprising:

a non-hollow elongate shaft, said non-hollow elongate shaft having a length, an exterior surface extending along said length, and a first stiffness; and

a composite wrapping, said composite wrapping encircling said exterior surface along at least a portion of said length;

wherein said reinforced support pole has a second stiffness, said second stiffness being at least 20 percent greater than said first stiffness.

30. The reinforced support piling of claim 29 wherein said second stiffness is at least 30 percent greater than said first stiffness.

31. The reinforced support piling of claim 29 wherein said second stiffness is at least 35 percent greater than said first stiffness.

32. The reinforced support piling of claim 29 wherein said second stiffness is at least 38 percent greater than said first stiffness.

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33. The reinforced support piling of claim 29 wherein said non-hollow elongate shaft is comprised of wood.

34. The reinforced support piling of claim 33 wherein non-hollow elongate shaft has a moisture content of less than 25 percent.

35. The reinforced support piling of claim 34 wherein non-hollow elongate shaft has a moisture content within a range of 15 to 20 percent.

36. The reinforced support piling of claim 29 wherein said composite wrapping applies a radial compressive force upon said elongate shaft.

37. The reinforced support piling of claim 36 wherein said non-hollow elongate shaft is comprised of a material known to crack, to thereby increase the radial compressive force.

38. The reinforced support piling of claim 29 wherein said composite wrapping is a single, seamless layer.

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39. The reinforced support piling of claim 29 wherein said non-hollow elongate shaft is at least 10 feet long.

40. The reinforced support piling of claim 29 wherein said composite wrapping covers a portion of said a non-hollow elongate shaft adapted to be two feet below ground surface and four feet above ground surface when the wood support piling is installed in the ground.

41. The reinforced support piling of claim 29 wherein said composite wrapping is a single, seamless layer.

42. The reinforced support piling of claim 29 wherein said composite wrapping is bonded to said non-hollow elongate shaft.

43. The reinforced support piling of claim 42 wherein said composite wrapping is bonded to said non-hollow elongate shaft by a mechanical bond.

44. A method for reinforcing a wood pole with a composite wrapping, said method comprising:

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(A) winding a multiple-tow bundle of fibers about said wood pole and maintaining said fibers under tension within a range of 30-120 pounds;

(B) undertaking part (A) above in a manner sufficient to form said composite wrapping of a filament-wound fiber-reinforced bonding agent;

wherein said composite wrapping is bonded to said wood pole.

45. The method of claim 44 wherein said tension is approximately 100 pounds.

46. The method of claim 44 wherein the bundle of fibers comprises twelve tow strands.

47. The method of claim 44 further comprising applying a resin to the multiple-tow bundle of fibers with an impregnator.

48. The method of claim 47 wherein said impregnator comprises a resin bath, rollers, and doctor blades to saturate said multiple-tow bundle of fibers with said resin.

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49. The method of claim 44 further comprising passing said multiple-tow bundle of fibers through a carriage.

50. The method of claim 44 wherein said wood pole is at least 10 feet long.

51. The method of claim 44 wherein said composite wrapping covers a portion of said wood pole adapted to be two feet below ground surface and four feet above ground surface when the wood pole is installed in the ground.

52. The method of claim 44 wherein curing of said composite wrapping causes said composite wrapping to shrink to thereby radially compress said wood pole.

53. The method of claim 44 wherein the wood pole has a first stiffness prior to installation of the composite wrapping and a second stiffness after installation of the composite wrapping, and wherein the second stiffness is at least 20 percent greater than said first stiffness.

54. The method of claim 44 wherein said composite wrapping is a single, seamless layer.

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55. The method of claim 44 further comprising selecting said wood pole having a moisture content of less than 25 percent.

56. The method of claim 44 wherein said wood pole has a moisture content within a range of 15 to 20 percent.

57. The method of claim 44 wherein said composite wrapping is bonded to said wood pole by a mechanical bond.

58. The method of claim 44 further comprising winding said multiple-tow bundle of fibers about said wood pole at an angle within a range of 60-90 degrees with respect to a longitudinal axis of the wood pole.

59. The method of claim 58 wherein said angle is approximately 80 degrees.

60. A method for reinforcing a wood support piling with a composite wrapping, said method comprising:

(A) selecting said wood support piling having a moisture content within a range of 15 to 20 percent;

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(B) placing said wood support piling on a filament winding apparatus;

(C) applying a resin to a multiple-tow bundle of fibers by passing said multiple-tow bundle of fibers through an impregnator, said impregnator comprising a resin bath, rollers, and doctor blades;

(D) rotating said wood support piling;

(E) winding said multiple-tow bundle of fibers about said wood support piling and applying tension to said plurality of strands during said winding such that said tension becomes applies to said wood support piling, and maintaining said fibers under tension within a range of 30-120 pounds, said multiple-tow bundle of fibers being wound about said wood support piling at an angle within a range of 60-90 degrees with respect to a longitudinal axis of the wood support piling;

(F) undertaking parts (C) to (E) above in a manner sufficient to form said composite wrapping of a filament-wound fiber-reinforced bonding agent;

(G) allowing said resin to cure wherein said composite wrapping is bonded to said wood support piling with a mechanical bond;

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wherein the bundle of fibers comprises twelve tow strands;

wherein said wood piling is at least 10 feet long;

wherein said composite wrapping covers a portion of said wood support piling adapted to reside two feet below ground surface and four feet above ground surface when the wood support piling is installed in the ground;

wherein the curing of said composite wrapping causes said composite wrapping to shrink to thereby radially compress said wood support piling;

wherein said reinforced support piling has a second stiffness, said second stiffness being at least 35 percent greater than a first stiffness of said wood support piling without said composite wrapping;

wherein said composite wrapping forms a layer of substantially uniform thickness; and

wherein said composite wrapping is a single, seamless layer.

61. A method for reinforcing a wood pole with a composite wrapping, said method comprising:

(A) selecting said wood pole having a moisture content of less than 25 percent;

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(B) winding a multiple-tow bundle of fibers about said wood pole;

(C) undertaking part (B) above in a manner sufficient to form said composite wrapping of a filament-wound fiber-reinforced bonding agent.

62. The method of claim 61 wherein said moisture content is within a range of 10 to 25 percent.

63. The method of claim 61 wherein said moisture content is within a range of 15 to 20 percent.

64. The method of claim 61 wherein said composite wrapping is bonded to said wood pole by a mechanical bond.

65. The method of claim 61 wherein the plurality of strands comprises windings that form an angle within a range of 60-90 degrees with respect to a longitudinal axis of said wood pole.

66. The method of claim 65, wherein the angle formed by the windings of the plurality of strands is approximately 80 degrees.

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67. The method of claim 6, wherein the wood piling is at least 25 feet long.

68. The method of claim 16, wherein the part (c) further comprises forming a mechanical bond between the resin and fibers of the wood support piling.

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